

We Claim:

1 1. A vapor compression system comprising:
2 a compressor for receiving low pressure refrigerant vapor at a first suction
3 inlet and for discharging high pressure vapor;
4 a condenser for receiving the high pressure vapor and converting at least a
5 portion thereof to a lower temperature liquid;
6 an expansion device for receiving said liquid and expanding it to a lower
7 pressure vapor;
8 an evaporator for receiving said lower pressure vapor at a low temperature
9 and delivering it to said compressor at a higher temperature; and
10 a subcooler for receiving a portion of said liquid refrigerant from said
11 condenser to subcool another portion of said liquid refrigerant passing from said
12 condenser to said expansion valve, said subcooler being fluidly connected to a
13 second suction inlet of said compressor.

1 2. A system as set forth in claim 1 wherein said compressor includes
2 two sections, each section having a suction inlet.

1 3. A compression system as set forth in claim 2 wherein said
2 compressor is a multi-cylinder compressor and each of said two sections is driven by
3 separate cylinder groups.

1 4. A vapor compression system as set forth in claim 3 wherein one
2 section is driven by a plurality of cylinders and another section is driven by a single
3 cylinder.

1 5. A compression system as set forth in claim 4 wherein a circuit
2 containing said subcooler is driven by a single cylinder.

1 6. A compression system as set forth in claim 2 and including unloading
2 circuits in at least one section to fluidly interconnect a high pressure side to a low
3 pressure side of said compressor.

1 7. A compression system as set forth in claim 1 wherein said subcooler
2 has associated therewith an isolation valve which may be closed to effectively
3 remove the subcooler from operation.

1 8. A compression system as set forth in claim 1 and including a
2 subcooler expansion device upstream of said subcooler.

1 9. A compression system as set forth in claim 1 and including a check
2 valve posed between said subcooler and said second suction inlet.

1 10. A method of selectively boosting the capacity of a vapor compression
2 system having a compressor, a condenser, an expansion valve and an evaporator
3 comprising the steps of:

4 providing first and second suction inlets to said compressor;
5 providing a subcooler to receive a first portion of refrigerant from the
6 condenser to cool a second portion of refrigerant from the condenser prior to its flow
7 to the expansion valve; and
8 providing for the flow of said first portion of refrigerant from said subcooler
9 to said second suction inlet.

1 11. A method as set forth in claim 10 and including a step of delivering
2 refrigerant from said expansion valve to said first suction inlet.

1 12. A method as set forth in claim 11 and including the step of applying
2 multiple cylinders to compress the refrigerant being delivered to said first suction
3 inlet.

1 13. A method as set forth in claim 13 and including the step of applying a
2 single cylinder of said compressor to compress the refrigerant being delivered to said
3 second suction inlet.

1 14. A vapor compression system for a refrigerated vehicle, comprising:
2 a compressor for receiving a low pressure refrigerant vapor and delivering a
3 high pressure refrigerant vapor, said compressor having first and second sections,
4 each of which is capable of compressing refrigerant vapor;
5 a condenser for receiving refrigerant vapor from said compressor and
6 delivering liquid refrigerant;
7 an expansion valve for receiving at least a portion of said liquid refrigerant
8 and converting it to a low pressure refrigerant vapor;
9 an evaporator for receiving low pressure refrigerant vapor from said
10 expansion valve and delivering higher temperature refrigerant vapor to said first
11 compression section; and
12 a subcooler for receiving a portion of said liquid refrigerant from said
13 condenser to subcool said portion of said liquid refrigerant passing to said expansion
14 valve, said subcooler being fluidly connected to said compressor second section.

1 15. A system as set forth in claim 14 wherein said subcooler is connected
2 to selectively provide for the flow of refrigerant to said second section.

1 16. A system as set forth in claim 14 wherein said first and second
2 section have separate suction inlets.

1 17. A system as set forth in claim 14 wherein said first section has
2 multiple reciprocating cylinders.

1 18. A system as set forth in claim 14 wherein said first section has at least
2 one unloading circuit.

1 19. A system as set forth in claim 14 wherein said second section
2 includes a single reciprocating cylinder.